

WHAT IS CLAIMED IS:

1. A solid state image device comprising:

5 a gate insulator film formed on a semiconductor
substrate;

a first gate electrode, formed on said gate insulator
film, having a substantially flat upper surface; and

10 a second gate electrode formed on said gate insulator
film through an insulator film having a thickness smaller
than the minimum limit dimension of lithography to be
adjacent to said first gate electrode without overlapping
said first gate electrode.

15 2. The solid state image device according to claim 1,
wherein

said insulator film includes a thermal oxide film.

3. The solid state image device according to claim 1,
wherein

20 said second gate electrode has a substantially flat
upper surface.

4. The solid state image device according to claim 3,
wherein

25 the upper surfaces of said first gate electrode and

said second gate electrode are substantially flush with each other.

5 5. The solid state image device according to claim 4,
wherein

the upper surface of said insulator film is substantially flush with the upper surfaces of said first gate electrode and said second gate electrode.

10 6. The solid state image device according to claim 1,
wherein

said gate insulator film includes an insulator film at least partially having an oxidation inhibiting function.

15 7. The solid state image device according to claim 1,
wherein

said gate insulator film includes a first gate insulator film and a second gate insulator film formed on said first gate insulator film.

20 8. The solid state image device according to claim 7,
wherein

at least either said first gate insulator film or said second gate insulator film has an oxidation
25 inhibiting function.

9. A method of fabricating a solid state image device,
comprising steps of:

forming a gate insulator film on a semiconductor
5 substrate;

forming a plurality of first gate electrodes having
substantially flat upper surfaces on said gate insulator
film at a prescribed interval;

forming insulator films on the side surfaces of said
10 first gate electrodes; and

forming a second gate electrode adjacent to said
first gate electrodes without overlapping said first gate
electrodes through said insulator films by depositing a
second gate electrode layer to fill up a region located
15 between said first gate electrodes and thereafter removing
an excess depositional portion of said second gate
electrode layer by polishing.

10. The method of fabricating a solid state image
20 device according to claim 9, wherein

said step of forming said second gate electrode
includes a step of depositing said second gate electrode
layer having a thickness substantially identical to the
thickness of said first gate electrodes to fill up said
25 region located between said first gate electrodes.

11. The method of fabricating a solid state image device according to claim 9, wherein

5 said step of forming said second gate electrode includes a step of forming said second gate electrode having a substantially flat upper surface by removing said excess depositional portion of said second gate electrode layer by polishing.

10 12. The method of fabricating a solid state image device according to claim 11, wherein

 said step of forming said second gate electrode includes a step of forming said second gate electrode having an upper surface substantially flush with the upper
15 surfaces of said first gate electrodes by removing said excess depositional portion of said second gate electrode layer by polishing.

20 13. The method of fabricating a solid state image device according to claim 9, further comprising a step of forming a polishing stopper film on said first gate electrodes in advance of said step of forming said second gate electrode, wherein

25 said step of forming said second gate electrode includes a step of forming said second gate electrode

adjacent to said first gate electrodes without overlapping
said first gate electrodes through said insulator films by
polishing said excess depositional portion of said second
gate electrode layer through said polishing stopper film
5 serving as a stopper.

14. The method of fabricating a solid state image
device according to claim 9, wherein

10 said step of forming said insulator films on the side
surfaces of said first gate electrodes includes a step of
forming thermal oxide films on the side surfaces of said
first gate electrodes by thermally oxidizing the side
surfaces of said first gate electrodes.

15 15. The method of fabricating a solid state image
device according to claim 14, wherein

said step of forming said thermal oxide films
includes a step of forming said thermal oxide films having
a thickness smaller than the minimum limit dimension of
20 lithography.

16. The method of fabricating a solid state image
device according to claim 14, wherein

said step of forming said gate insulator film
25 includes a step of forming said gate insulator film

including an insulator film at least partially having an oxidation inhibiting function.

17. The method of fabricating a solid state image
5 device according to claim 9, wherein

said step of forming said gate insulator film
includes steps of:

forming a first gate insulator film, and

forming a second gate insulator film on said first
10 gate insulator film.

18. The method of fabricating a solid state image
device according to claim 17, wherein

at least either said first gate insulator film or
15 said second gate insulator film has an oxidation
inhibiting function.

19. The method of fabricating a solid state image
device according to claim 9, further comprising a step of
20 forming an impurity region in a self-aligned manner on a
portion of said semiconductor substrate located under a
region formed with said second gate electrode by ion-
implanting an impurity into said semiconductor substrate
through at least said first gate electrodes serving as
25 masks in advance of said step of forming said second gate

electrode.

20. The method of fabricating a solid state image device according to claim 19, wherein

5 said step of forming said impurity region includes a step of ion-implanting said impurity into said semiconductor substrate through said first gate electrodes and said insulator films serving as masks.

10 21. The method of fabricating a solid state image device according to claim 19, wherein

 said step of forming said impurity region includes steps of:

15 forming a mask layer to partially cover said region formed with said second gate electrode, and

 ion-implanting said impurity into said semiconductor substrate through said first gate electrodes and said masks layer serving as masks.